

presents the tessellated appearance; *h*, tesseral division, much magnified, to show microspinous processes (diagrams).

Fig. 8. *Hydradendrium spinosum*, n. gen. et sp., natural size of specimen. *a*, growth of dendriform spines (see *g*); *b*, portion of stem, much magnified, to show rows of spines, viewed laterally; *c*, horizontal section of stem and spines, to show that the stem is composed of concentric laminae developed on *d*, the axial canal, from which *pari passu* are developed the spines: scale 1-48th to 1-1800th inch. *e*, spine, much more magnified, to show that it also is composed of concentric laminae, but solid and imperforate towards the free end; *f*, end of branch, to show commencement of spinal development on the medullary sarcode: scale 1-24th to 1-1800th inch. *g*, dendriform growth of spines produced by the cœnosarc (see *a*): scale 1-48th to 1-1800th inch.

[To be continued]

XLI.—*On a Collection of Crustacea from the Malaysian Region*.—Part IV. Penaeidea, Stomatopoda, Isopoda, Suctorina, and Xiphosura. By EDWARD J. MIERS, F.L.S., F.Z.S.

[Plate XV.]

[Concluded from p. 384.]

*PENÆIDEA*.

*Penæus avirostris*, Dana.

W. Borneo.

I refer to this species two female specimens of *Penæus* in the collection. They agree with Dana's description in the form of the rostrum, fifth ambulatory legs, &c. In both the rostrum is prolonged backward into a somewhat indistinct median dorsal carina, which, however, is obsolete near the posterior margin. The rostrum, in the only perfect specimen, is 7-toothed above.

This species was not represented in the Museum collection when I wrote my analytical table of the species of *Penæus* (P. Z. S. 1878, p. 306); and the examination of the foregoing examples shows that it should be classed (in that synopsis) in the neighbourhood of *P. monoceros* and *P. Dobsoni*, on account of the distinct dorsal ridge of the carapace.

*Penæus sculptilis*, Heller.

W. Borneo (a female).

This specimen agrees very well with the description and figure of Heller, based on examples from Java. Like the

preceding it has been hitherto a desideratum to the Museum collection\*.

There is also in the collection a small specimen of *Penæus* which, on account of the imperfection of the rostrum, I cannot at present determine with certainty.

*Stenopus hispidus*, Latr.

New Guinea (an adult female of large size).

STOMATOPODA.

*Lysiosquilla maculata* (Fabr.).

Goram (a young male).

*Squilla nepa*, Latr.

West Borneo (an adult female).

*Pseudosquilla ciliata* (Fabr.).

New Guinea (an adult female).

\* The following additional species have been lately received by the British Museum:—

*Penæus Macleayii*, Haswell.

A specimen has recently been purchased (together with one of *P. canaliculatus*) from Mr. A. P. Goodwin, who collected them at the mouth of the Richmond River, New South Wales. Mr. Haswell's types were from Port Jackson. This species, with several others still desiderata to the Museum, has been described by him since the publication of my paper. Its place in the classification is in the vicinity of *P. affinis* and *P. avirostris*.

*Penæus Joyneri*, sp. n. (Plate XV. figs. 8-10.)

Carapace more or less pilose above, with the antennal and gastro-hepatic sulci faintly indicated; no pterygostomial spine. Rostrum nearly straight, acute, slender, and not reaching to the end of the antennal scale, armed above with seven or eight teeth, of which the posterior three are situated on the carapace behind its anterior margin, the last being separated from the rest by a wider interval; the anterior third of the upper margin and the lower margin are without spines. A longitudinal median dorsal line on the surface of the carapace indicates the obsolete dorsal ridge; and a similar line exists on the first three post-abdominal segments. The first segment has a rounded tooth on each lateral margin. The fourth to sixth postabdominal segments are acutely carinated above. The terminal segment has a longitudinal median groove on its dorsal surface; its lateral margins are without spines; and its distal end is produced and acuminated. The eyes are large, the antennular flagella very short; the exognathi of the outer maxillipedes scarcely reach beyond the end of the penultimate joint. The second joint of the first and second legs (in the male) is armed with a spine

*Gonodactylus scyllarus* (Linn.).

Amboina (an adult male), Goram (an adult male), New Guinea (a male), Lette Island (a female?).

The specimens from New Guinea and Lette Island approach *G. Bleekeri*, A. Milne-Edwards, in having the median dorsal carina of the terminal postabdominal segment more elevated and acute; but the rostrum, although acute, is not more produced at its distal end than in the typical *G. scyllarus*.

*Gonodactylus chiragra* (Fabr.).

Java, Karangbollong (an adult female), New Guinea (an adult male), Amboina (a small male), Celebes, Macassar (an adult female).

The largest specimen (that from New Guinea) measures fully 4 inches from the tip of the rostrum to the terminal segment. The dilatation at the proximal end of the dactylus is of a pinkish tinge shading into blue; the distal end of the dactylus is always more or less inflexed.

*Gonodactylus graphurus*, White.

Amboina (an adult male). A male of small size is in the collection without special locality, in which, however, the genital appendages are perfectly developed.

on the under surface; the third legs, in place of this spine, are armed with a straight and slender styliform appendage, which reaches to the middle of the merus joint, and is furnished at its distal end with a spear-like head, which is acute in front, laterally dilated and produced posteriorly; the merus joint of the fourth legs is dilated, carinated, and armed with a strong tooth in the middle of its inferior margin. This joint in the fifth legs, which are slender and much elongated, is less dilated, but distinctly toothed (see the figures). In the female, the third legs are armed only with a small spine. Length of the single male about  $4\frac{1}{3}$  inches.

*Hab.* Yokohama, Japan (*H. Batson Joyner, Esq.*).

Several specimens are in the collection.

I have much pleasure in associating this species with the name of its discoverer, who presented it, with several other interesting forms, to the British Museum. The peculiarity in the structure of the third to fifth ambulatory legs in the male, and particularly the remarkable appendages to the basis joints of the second legs (which, it may be presumed, serve as claspers during the act of coition), distinguish it from its congeners; but both sexes are further distinguishable by the form and dentition of the rostrum, and of the laterally unarmed terminal segment. It is allied to *P. avirostris*, Dana, and *P. Mastersii*, Haswell; but in the former species the rostrum is much more strongly carinated above, and in the latter the terminal segment is not acuminate; both, moreover, have a distinct dorsal carina on the carapace.

*Gonodactylus trispinosus*, White.

Amboina (an adult female).

This example agrees in all particulars with the two in the Museum collection from Sharks' Bay, W. Australia, which differ somewhat from the type (from Swan River) in the larger tubercles of the terminal segment, and the more numerous and regular denticulations of its posterior margin. The terminal segment is scantily clothed with short hairs.

## ISOPODA.

The Isopoda in Dr. Bleeker's collection were nearly all contained in a single bottle, without any special indication of locality. Upon examination, however, this bottle was found to contain fourteen out of the sixteen species described by him in his memoir on the Malaysian Cymothoidæ, already referred to\*.

Two or three other species, which are not included in that paper, were also found in the collection, and are described or referred to below.

In several of the species, and particularly in the large series of specimens of *Cymothoa Leschenaultii*, can be traced the gradual modification of the external sexual organs, accompanying the transformation of the young male individual into the fully-grown and perfectly-developed female, as detailed by Bullar† and Dr. P. Mayer‡, in their recent important researches demonstrating the existence of hermaphroditism and illustrating the various stages of development in the parasitic Cymothoidæ. Further details are given below, under the heads of the different species.

## ONISCIDEA.

*Ligia Gaudichaudii*.

? *Ligia Gaudichaudii*, M.-Edw. Hist. Nat. Crust. iii. p. 157 (1840);  
? Gay, Hist. Chile, iii. p. 265 (1849); ? Dana, Cr. U.S. Expl. xiv.  
p. 741, pl. xlix. fig. 6 (1853).

A considerable number of specimens without definite locality are in the collection, which agree very well with the description and figure of Dana. Unfortunately in all of these the antennæ are imperfect and the uropoda are wanting. An

\* "Sur les Isopodes Cymothoadiens de l'archipel Indien," in Acta Societatis Scient. Indo-Neerlandicæ, ii. (1857).

† Journ. Anat. Physiol. xi. p. 118 (1876).

‡ Mittheil. Zoolog. Stat. Neapel, i. (Heft 2) p. 165 (1879).

example belonging to the same species is in the British-Museum collection from Madgica Sima.

Whether this be the *L. Gaudichaudii* of Milne-Edwards must remain somewhat uncertain, on account of the brevity of his description; the habitat of his types was probably Chilian.

#### CYMOTHOIDEA.

##### *Cymothoa Leschenaultii*.

*Cymothoa Leschenaultii*, Leach, Dict. Sci. Nat. xii. p. 352 (1818).

*Cymothoa Stromatei*, Bleeker, Acta Soc. Sci. Indo-Neerland. ii. p. 35, pl. ii. fig. 13 (1857), ad. ♀.

*Cymothou Edwardsii*, Bleeker, t. c. p. 34, pl. ii. fig. 12 (1857), jun. ♂.

This species would appear to be one of the commonest of the Malaysian Cymothoidea, if one may judge from the very large series in the collection. I have observed a considerable variation in the form of the antero-lateral lobes of the first segment of the body and of the basis joint of the last pair of legs, and can see no sufficient reason for regarding Bleeker's species as distinct from the *Cymothoa Leschenaultii* of Leach, of which, unfortunately, only a single specimen from Pondicherry is in the collection. Adult and full-sized examples of this species are nearly  $1\frac{1}{2}$  inch in length; and amongst these are many in which the brood-pouch is fully developed; but there are not a few others, scarcely inferior in size, in which no trace of it exists. Two or three specimens are in the collection (length of the largest  $1\frac{1}{3}$  inch), exhibiting that interesting transitional stage in the development of the animal, recently described by Prof. Schiödte (see Ann. & Mag. Nat. Hist. ser. 5, ii. p. 196), during which copulation takes place, and in which the ovigerous pouch is developed upon the three posterior segments of the body only. The largest of the specimens, in which the external genital organs of the male are developed upon the ventral surface of the seventh thoracic segment, measures a little over 1 inch in length; but the majority are much smaller, some not exceeding half an inch. These agree in all essential characters with *C. Edwardsii* as described by Bleeker, which, therefore, I doubt not, was founded on the younger male form of the species. The adult female form of the species is apparently not invariably to be distinguished by its greater size; for there is in the series one example which does not seem specifically distinct, although of somewhat abnormal growth, which bears ova in the perfectly formed brood-pouch, yet measures only  $\frac{3}{4}$  inch in length.

*Cymothoa irregularis*, Bleeker.

Of this species (which, according to Dr. Bleeker, is common on fishes in the seas of Amboina) a good series is in the collection, including several specimens in which the brood-pouch is well developed (length of the largest 1 inch), and others in which it does not exist; but in these examples no external male organs are observable; the largest is about 8 lines. Even in the smallest the characteristic lunate form of the first thoracic segment is very apparent.

There is a specimen in the Museum collection, apparently referable to the *Cymothoa rhinoceros* of Bleeker, which certainly cannot remain in the genus *Cymothoa*; but, on account of its very mutilated condition, I cannot refer it with certainty to any described genus. It has neither male nor female external genital appendages. The head is transverse, eyes of moderate size; rostrum reflexed at tip, interantennal process small, and not dividing the upper antennæ at base, the first joints of the upper antennæ are not greatly dilated; the lower antennæ broken, but evidently reaching beyond the posterior margin of the first thoracic segment. The so-called epimeræ or coxal joints of the second to seventh legs are distinct. The basis joints of the legs are not dilated, and the terminal claw small but strongly curved; terminal segment triangular, and uropoda with the inner ramus the larger and somewhat obovate, outer slender, but not acute at apex.

*Anilocra marginata*.

*Cymothoa marginata*, Bleeker, Isopodes Cymothoadiens, in Acta Soc. Scient. Indo-Neerland. ii. p. 36, pl. ii. fig. 14 (1857).

Two specimens are in the collection. According to Bleeker it is found on fish in the seas of Batavia. This species must, I think, be placed in the genus *Anilocra*, on account of the linear form of the basis joints of the ambulatory legs. The violet band on the posterior margin of the body-segments is in these specimens (that have long been immersed in spirits) of a brown hue. The larger example (length 11 lines) is a fully-developed female; the smaller (length about 7 lines), without brood-pouch, has yet some traces of the median prominences of the seventh thoracic segment, characteristic of the male.

*Anilocra dimidiata*, Bleeker.

A large number of specimens are in the collection, nearly all of which are fully-developed females. It lives, according to Dr. Bleeker, on different fishes in the seas of Batavia.

The length of a full-sized specimen is about  $1\frac{1}{3}$  inch, of one of the smallest (with brood-pouch) about  $\frac{3}{4}$  inch. There are one or two specimens in which neither brood-pouch nor external male organs exist (length of the largest  $\frac{5}{8}$  inch).

*Anilocra alloceræa*.

? *Anilocra leptosoma*, Bleeker, *t. c.* p. 30, pl. i. fig. 6 (1857).

*Anilocra alloceræa*, Kölbel, Sitz. Ak. Wien, lxxviii. p. 407, pl. ii. fig. 1 (1879).

Four specimens, females, are in the collection. In one only of these are the antennæ and uropoda in a perfect condition. The first pair of antennæ agree exactly in the form of their fourth and fifth joints with Kölbel's excellent description and figure. In every other respect they so closely resemble the *Anilocra leptosoma* of Bleeker, that I at first assigned them without hesitation to that species; and I am even now inclined to regard it as probable that Bleeker's remarks and figure of the antennæ may be inaccurate, and the two forms really referable to one and the same species; and this I think the more likely, as the two species inhabit the same geographical region. Bleeker, it may be observed, notes that the uropoda in *A. leptosoma* do not reach beyond the extremity of the terminal postabdominal segment; in his figure, however, they are represented as distinctly longer than this segment, in this particular agreeing both with Kölbel's description of *A. alloceræa* and with the specimen before me\*.

\* I may take this opportunity of noting that the larger of the two original examples of *Ceratothoa trigonocephala* (*Cymothoa trigonocephala*, Leach, and the one which bears his MS. label and must be considered as the type) differs from *C. trigonocephala* as figured by Kölbel (pl. i. fig. 3), and resembles *C. oxyrhynchæna* of that author, in the form of the head (which has the lateral margins straight and the front acute) and in the form of the antero-lateral processes of the first segment of the body, which in a lateral view are rather broad, and in a dorsal view appear narrowed at their apices. It differs from *C. oxyrhynchæna*, however, in the form of the penultimate postabdominal segment, which has the posterior margin sinuated in the middle and on each side, and therein agrees with Kölbel's description of the specimens he refers to *trigonocephala*. Length  $1\frac{2}{3}$  inch.

The smaller example (length  $10\frac{1}{2}$  lines) agrees more nearly with Kölbel's figure of *C. trigonocephala* in having the lateral margins of the head slightly sinuated and the front less acute; the apices of the antero-lateral processes of the first segment of the body, however, are narrowed both in a lateral and dorsal view; the form of the penultimate postabdominal segment sinuated, as in the larger example. As the exact localities of these examples are not known, it is difficult to determine whether the two belong to distinct species, or whether the differences indicated by Kölbel are not perhaps rather to be regarded as of less than specific value. The basis joint of the seventh pair of legs is, in both specimens, much less dilated posteriorly than in *C. oxyrhynchæna*.

## RENOCILA, gen. nov.

Allied to *Anilocra* in most of its characters; but the 8-jointed superior antennæ are greatly developed, reaching nearly to the posterior margin of the first thoracic segment, with all the joints (the terminal excepted) more or less dilated and compressed, so as entirely to conceal the very small inferior antennæ; the dilatation is greatest in the third joint (the second visible in a dorsal view), the following joints becoming successively smaller. The inferior antennæ are small and 7-jointed, reaching nearly to the end of the fifth joint of the upper antennæ. The eyes are small and indistinct, and placed near the postero-lateral angles of the head, which is truncated anteriorly; the front not produced inferiorly, so as to conceal the bases of the antennæ. The fifth to seventh thoracic segments are greatly prolonged backward at their postero-lateral angles, so as (in the sixth and seventh segments) entirely to conceal the "epimera" or coxal joints; the postero-lateral lobes of the seventh thoracic segment reach beyond the base of the terminal postabdominal segment. The coxal joints of all the legs are posteriorly acute; those of the second to fifth legs well developed and visible in a dorsal view. None of the legs have the basis joints dilated; and all terminate in very strong curved claws. The uropoda do not reach to the posterior margin of the transverse posteriorly-rounded terminal segment, and are furnished with slender rami, the outer of which is a little longer than the inner.

This genus, in all its characters, is most nearly allied to *Anilocra*, from which it is distinguished by its broad non-inflexed front, the greatly produced postero-lateral angles of the three posterior thoracic segments, and the greatly dilated superior antennæ.

*Renocila ovata*, sp. n. (Pl. XV. figs. 11-14.)

The body is moderately convex, ovate; the head, which is scarcely broader than long, has the posterior margin rounded, and the sides slightly convergent to the straight anterior margin, which is inflexed, but not produced so as to conceal the bases of the antennæ. The first thoracic segment is a little longer than the two following, and its postero-lateral angles are slightly prolonged backward and rounded; the two following segments are not so produced; in the fourth segment the postero-lateral lobes are very small, in the fifth to seventh segments they are (as stated above) greatly developed, not acute, but rounded at the distal ends, and with the



lateral margins slightly reflexed; the first five postabdominal segments are very short, and are not laterally produced; the terminal segment is almost semicircular in outline, smooth above, with a longitudinal median raised line on its upper surface. The second joint of the antennæ (in a dorsal view) is considerably enlarged and nearly quadrate; the following joints (except the last) of a similar form, but successively smaller, the terminal minute and slender. The penultimate and antepenultimate joints of the inferior antennæ are slender and more elongated than the preceding, the terminal is minute. The coxal joints of the second to fifth legs become successively more acute; those of the sixth and seventh legs are acuminate and spiniform (in an inferior view). None of the basis joints of the thoracic legs are dilated or distinctly carinated; the rami of the uropoda are slender and rounded at the distal ends. Length of the larger example about 11 lines, breadth  $5\frac{1}{2}$  lines.

Two specimens are in the collection, both presenting the characters of the female sex, the brood-pouches being developed. The length of the smaller is 8 lines.

The dilatation of the antennal joints is analogous to that characteristic of the genus *Ceratothoa*; but the antennæ are remote from one another at their base.

*Lironeca emarginata*, Bleeker.

This species is represented in the collection by a single specimen (a female) of large size (nearly 1 inch 4 lines).

The *Lironeca laticauda* described by me (P. Z. S. 1877, p. 677, pl. lxxix. fig. 5) from Manchuria is distinguished by the form of the front, which is not produced, by the much broader coxal joints of the thoracic legs (which are not fully exhibited in the dorsal view of the animal given in the figure cited above), and the more dilated basis joints of the three posterior pairs of thoracic limbs.

*Lironeca Renardi*, Bleeker.

Of this species (as of the preceding) there is in the collection only a single specimen (a female). The strongly-lunate form of the first segment of the body, with its projecting antero-lateral lobes, gives it a resemblance to *Cymothoa irregularis*. Length  $\frac{2}{3}$  inch (8 lines). Both this and the preceding species are stated by Bleeker to have been taken from the skin of various fishes inhabiting the sea of Batavia. *L. Renardi* bears a considerable resemblance to the freshwater *L. dawrica*, described by me (*l. c.* p. 676, pl. lxxix. fig. 4)

from the River Onon, in Dauria, South-eastern Siberia, but may be distinguished by the form of the coxæ, which in *L. Renardi* extend along the whole length of the lateral margins of the segments of the body to which they are respectively attached. Of *L. Renardi* there is in the Museum collection a female taken from a species of *Mugil* inhabiting the Indian seas (*Dr. F. Day, F.L.S.*).

*L. daurica* is very closely allied to *L. Jellinghausii* (*Ichthyoxenus Jellinghausii*, Herklots, Arch. Néerlandaises, v. p. 128, pl. v. fig. 10-18) from the fresh waters of Java, with which I should be inclined to unite it, were it not for the widely separated localities of the two species, as it apparently differs in nothing but the somewhat shorter uropoda of the penultimate segment.

I have no information as to whether *L. daurica* penetrates the body of its host behind the ventral fins, as does *L. Jellinghausii*. Except for its peculiar habitat, I can see nothing to distinguish *Ichthyoxenus* from *Lironeca*; but because Herklots had described the Javan species as a distinct genus I did not suspect its affinity with the Daurian form when I described the latter.

It does not appear that a generic character can be found in the position of the coxæ, *i. e.* their insertion in the angles between the thoracic segments, since Herklots notes a variation of this character in specimens he considers to be males of *L. Jellinghausii*\*

#### *Lironeca Boscii*, Bleeker.

A considerable series is in the collection. The largest example (length about 10 lines) exhibits the characters of the male sex, and is the only one in which they are distinctly observable. The greater number are well-developed females, the largest being about 9 lines long ( $\frac{3}{4}$  inch).

*Lironeca ornata*, Heller, from Sambelong, is a nearly allied form, but is distinguished by the triangular terminal segment, which is produced greatly beyond the extremity of the rami of the uropoda.

\* Closely allied species are in the Museum collection from the Mauritius (*R. Templeton, Esq.*), designated, but not described, by White as *Cymothoa micronyx*, and from Australia (*Earl of Derby and J. B. Jukes, Esq.*), as *Cymothoa contracta*. *Lironeca contracta* is apparently distinguishable by the much broader, more dilated basis joints of the four posterior thoracic limbs and subacute rostrum, *Lironeca micronyx* by the transverse terminal segment and the less marked carina of the posterior thoracic limbs; the specimens of the latter species, however, are much shrivelled from having been preserved in a dry state. In all of the above the coxæ are inserted in the angles between the thoracic segments.

*Lironeca lata*, Dana, from the Sandwich Islands, seems to be in some degree intermediate between this species and *L. emarginata*, as in it the head is somewhat more deeply encased in the first segment of the body, but the terminal segment does not project beyond the extremity of the uropoda.

*Lironeca pterygota*, Kölbel.

This species is represented in the collection by a single specimen of very small size (length  $4\frac{1}{2}$  lines) found among specimens of *Nerocila phaeopleura*. It agrees with Kölbel's description in all respects, except in the somewhat longer antennæ, the superior pair reaching to the posterior margin of the head, and the inferior pair to the middle of the lateral margins of the first thoracic segment. The very unequal development of the coxæ (those of the convex side of the body being much the larger) would seem to distinguish it from *L. Boscii*, to which, in its distorted form, it bears much external resemblance.

*Nerocila trivittata*, Bleeker.

This species, which, according to Dr. Bleeker, inhabits the seas of Amboina, is represented in the collection by a single specimen (a female, length nearly 9 lines). Dr. Bleeker's description was drawn up from a unique specimen; but the example before me is probably not the one figured by him, which is of larger size and may have been one obtained subsequently.

*Nerocila phaeopleura*, Bleeker.

A large series of specimens are in the collection, of which the greater number are females with well-developed brood-pouches. Length of a full-sized example 1 inch, of one of the smallest 7 lines. There are several specimens in which no brood-pouch exists; but in none of these have I observed external male organs. Length of one of the largest 9 lines.

*Nerocila dolichostylis*, Kölbel, is a nearly allied form, but distinguished by having the postero-lateral angles of all the segments produced into spines. In *N. phaeopleura* usually only the first and seventh segments are thus produced.

*Nerocila laevinota*, sp. n. (Pl. XV. figs. 15, 16.)

Body narrow-oval, about two and a half times as long as its greatest breadth, rather convex. Head with the frontal margin produced, rounded, and concealing the bases of the antennæ. Thoracic segments with their tergal portions smooth, and in no case produced at the postero-lateral angles;

the coxal joints of the second to fifth legs are posteriorly acute, but not produced beyond the postero-lateral angles of the segments; those of the sixth and seventh legs are more elongated, and form distinct spines. The lateral prolongations of the second (first exposed) and third postabdominal segments are elongated, laterally compressed, and acute; those of the fourth to sixth segments do not exceed half the length of the preceding; the terminal segment is large, flat, with the sides straight and parallel, with its distal end rounded, and with a longitudinal median raised line in the middle of its upper surface. The eyes are placed close to the postero-lateral angles of the head; the anterior antennæ are 8-jointed, reach a little beyond the posterior margin of the head, with the basal joint enlarged and subglobose; the posterior antennæ also are about 8-jointed. The dactyli of the four anterior thoracic legs are long and strongly curved; the rami of the uropoda unequal, the outer the longer and straight, the inner with a distinct tooth on its inner margin and with the distal extremity acute. Length about 1 inch.

West Borneo (an adult female).

The absence of tergal spines, the form of the coxæ and of the rami of the uropoda suffice to distinguish this species from its congeners. It is perhaps most nearly allied to *Nerocila aculeata*, an Indian species described by Milne-Edwards; but in this species the postero-lateral angles of the thoracic segments are produced into distinct spines.

A specimen from the Malabar coast in the British-Museum collection is allied to both *N. aculeata* and *N. levinota*, but apparently distinct from either. The length of the body barely exceeds twice its greatest breadth. The postero-lateral angles of the tergal portions of the fifth to seventh thoracic segments are produced into small distinct spines, as in *N. aculeata*; the form of the lateral prolongations of the segments of the postabdomen and of the uropoda, however, is nearly that of *N. levinota*. It is distinguished from both species by the great development of the coxal spines of the sixth and seventh legs, which are acuminate and nearly twice as long as the segments themselves (see Pl. XV. fig. 17). This I will designate *N. longispina*. It is possible that a large series would show intermediate gradations between the three forms; but, apart from such evidence, they must be regarded as distinct\*.

\* *Nerocila congener* is a name applied by White, without description, to a remarkable species of this genus in the Museum collection from the Philippine Islands. It is distinguished by the form of the head, which has the anterior margin broadly rounded and produced, so as almost

*Nerocila (Emphyllia) sundaica*?

? *Nerocila sundaica*, Bleeker, *t. c.* p. 26, pl. i. fig. 4 (1857).

*Emphyllia ctenophora*, Kölbel, Sitz. Ak. Wien, lxxviii. p. 414, pl. ii. fig. 4 (1879).

This fine species is represented in the collection by five specimens (four of which are well-developed females). Length of the largest about  $1\frac{1}{4}$  inch; the smallest example (length 1 inch) has no brood-pouch. These agree with the description of Bleeker in all essential particulars, and also with that of Kölbel, whose excellent figure leaves me in little doubt of the identity of the specimens before me with his *Emphyllia ctenophora*. Bleeker's figure, however, differs in some important points; *e. g.* the basal joints of the antennæ are not represented as dilated, but of the form ordinarily characteristic of *Nerocila*, and the inner rami of the uropoda as somewhat sinuated and not shorter than the outer. In all other respects the figure seems to be a very fair representation of *Emphyllia ctenophora*. But in four out of five of the specimens of *N. sundaica* in the collection, the superior antennæ have their basal joints less dilated than in Kölbel's figure, and not in contact, but separated by an interval of varying width; moreover I have shown, in the case of *Anilocra leptosoma*, that the accuracy of the minuter details of Bleeker's plates is not always to be relied upon. Thus, also the outer rami of the uropoda of *Nerocila sundaica* are described by Bleeker as much longer than the inner (in this agreeing with specimens before me), although, as stated above, both rami are represented as subequal in the figure.

On account of the variation in the dilatation of the basal antennal joints, it seems to me doubtful whether the genus *Emphyllia* can be permanently maintained; but until a complete transition has been observed from it to *Nerocila*, it may be useful to retain it at least as a subgenus.

*Corallana macronema*.

*Aega macronema*, Bleeker, *t. c.* p. 23, pl. i. fig. 1 (1857).

Two specimens (males) are in the collection. Length of the largest 9 lines. These specimens must, I think, certainly be referred to *Corallana*, and the species placed near *C. basalis*

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completely to conceal both pairs of antennæ. The postero-lateral angles of the first segment of the body are produced into a small acute tooth, and those of the seventh segment into a broader less acute lobe. The coxæ of all the thoracic limbs are rather broad, posteriorly acute, but do not project greatly beyond the postero-lateral angles of their several segments. The uropoda are wanting. Length 1 inch 2 lines.

and *C. collaris*, in the classification recently proposed by Schiödte and Meinert (Nat. Tidsskr. p. 287, 1879), on account of the distinct but narrow linear interantennular process (*lamina frontalis*). The maxillipedes are slender, the basal portion not exceeding the terminal palpus in width, and the six anterior legs armed with a very small terminal claw.

SUCTORIA *vel* RHIZOCEPHALA.

*Sacculina rotundata*, sp. n. (Pl. XV. figs. 18, 19.)

The animal in outline is transversely oval, somewhat compressed, without any trace of the depression at the proximal end of the sac which characterizes several of the oriental species recently described by Kossmann (Arbeit. zool.-zootom. Inst. Würzburg, i. pp. 121-136, 1872-74).

The integument (unless microscopically examined) appears smooth, but is transversely wrinkled, on account, perhaps, of the long immersion of the specimen in spirits. On that surface of the sac which is applied to the sternum of the crab on which the *Sacculina* is parasitic are two wide and shallow concavities, separated by an obtusely rounded longitudinal median ridge which fits into the sternal suture (as in *S. corculum*). The opposite face of the sac (*i. e.* that applied to the abdomen of the crab) is regularly convex. The funnel-shaped oral aperture is moderately produced, and very similar to that of *S. corculum* as figured by Kossmann (*t. c.* pl. v. fig. 1 a); the distal aperture of the sac (*Mantelöffnung*) is placed on the sternal surface, and does not project at all from the plane of the body. Length 5 lines, breadth 7 lines.

A single specimen is in the collection, parasitic on a male example of *Eriphia levimana*, without definite locality.

I cannot identify it with any of the numerously described species; but as I have not had the opportunity of comparing it with any of Kossmann's types, it is with much hesitation that I regard it as distinct.

In most particulars this species is very nearly allied to *S. corculum*, Kossmann (*t. c.* p. 122, pl. v. fig. 1), parasitic on *Atergatis floridus* from the Philippines. It differs chiefly in the transverse oval, not cordiform shape of the sac. The integument is armed with numerous minute spicules, which are most abundant and conspicuous near the distal opening, but quite imperceptible except under the microscope. They seem to be rooted in the cellular tissue, beneath the outer cuticle, and furthermore differ from the spinules of *S. corculum*, and more nearly resemble the infracuticular spicules of *S. crucifera*, Kossmann, in being very slender, not broader at

base; their apices are somewhat blunt. Such, at least, is the form of spicules taken from the vicinity of the distal opening of the sac (Pl. XV. fig. 19).

## XIPHOSURA.

*Limulus moluccanus*, Latr.

An adult male.

*Limulus rotundicauda*, Latr.

An adult female.

There is in the collection a specimen of small size (length of carapace about  $1\frac{1}{4}$  inch) which probably belongs to this species. As in all young specimens I have seen, the spines of the dorsal surface of the cephalothoracic shield are considerably developed. None of the above has any special indication of locality.

## EXPLANATION OF THE PLATES.

## PLATE XIII.

- Fig. 1. *Cyclocceloma tuberculatum*, gen. et sp. nov. (nat. size).  
 Fig. 2. Inferior view of buccal, antennal, and orbital region of the same ( $\times 2$  diam.).  
 Fig. 3. Inferior view of part of the antennal and orbital region of *Liomera Rodgersii*, Stimpson ( $\times 4$  diam.).  
 Fig. 4. *Pilumnopus granulatus*, sp. n. ( $\times 1\frac{1}{2}$  diam.).  
 Fig. 5. Inferior view of buccal, antennal, and orbital region ( $\times 2$  diam.).  
 Fig. 6. Outer view of chela of the unique example (a female) ( $\times 1\frac{1}{2}$  diam.).

## PLATE XIV.

- Fig. 1. *Telphusa sumatrensis*, sp. n., ♂ ( $\times 1\frac{1}{2}$  diam.).  
 Fig. 2. Outer view of larger hand of the same ( $\times 1\frac{1}{2}$  diam.).  
 Fig. 3. Outer view of hand of *Sesarma granosimana*, sp. n., ♂ ( $\times 1\frac{1}{2}$  diam.).  
 Fig. 4. Third maxillipede of *Pinnotheres obesus*, Dana? (considerably magnified).  
 Fig. 5. *Matuta circulifera*, sp. n., ♂ (nat. size).  
 Fig. 6. *Eupagurus japonicus*, Stimpson? (nat. size).  
 Fig. 7. Rostrum and ophthalmic scales of the same ( $\times 2$  diam.).  
 Fig. 8. Coxæ of the fifth ambulatory legs of male *Cænobita perlata*, var. *affinis*, n. ( $\times 2$  diam.).

## PLATE XV.

- Fig. 1. Antero-lateral margins of *Dromia (Dromidiu) orientalis*, sp. n., showing the form and disposition of the teeth (nat. size).  
 Fig. 2. Sternal sulci of the same (nat. size).  
 Fig. 3. Rostrum of *Atya moluccensis*, sp. n. (nat. size). 3 a, teeth of the inferior margin of the same (magnified).  
 Fig. 4. Third cephalothoracic leg of the same (nat. size).

- Fig. 5. Rostrum of *Atya spinipes*, Newport?, from the Samoa Islands (nat. size). 5 a, teeth of the inferior margin of the same (magnified).
- Fig. 6. Third cephalothoracic leg of the same, showing the specific distinction between this species and *Atya moluccensis* (nat. size).
- Fig. 7. Lateral view of the second postabdominal segment of *Enoplometopus dentatus*, sp. n. (nat. size).
- Fig. 8. Basal portion of one of the third cephalothoracic legs of *Penæus Joyneri*, sp. n., showing the remarkable appendage of the second or basis joint ( $\times 2$  diam.).
- Fig. 9. Basal portion of fourth cephalothoracic leg of the same, showing the dilatation and inferior tooth of the merus joint ( $\times 2$  diam.).
- Fig. 10. Basal portion of the fifth cephalothoracic leg, showing the form of the merus joint ( $\times 2$  diam.).
- Fig. 11. *Renoela orata*, gen. et sp. nov. ( $\times 1\frac{1}{2}$  diam.).
- Fig. 12. Head and antennæ of the same, dorsal view ( $\times 2$  diam.).
- Fig. 13. Inferior view of head, showing the form of the front and inferior antennæ ( $\times 2$  diam.).
- Fig. 14. Inferior view of postero-lateral lobe of the sixth thoracic segment, showing the position of the small coxa ( $\times 3$  diam.).
- Fig. 15. *Nerocila levinota*, sp. n. ( $\times 1\frac{1}{2}$  diam.).
- Fig. 16. Lateral view of coxa of sixth thoracic leg ( $\times 2$  diam.).
- Fig. 17. Lateral view of coxa of the same limb in *N. longispina*, sp. n. ( $\times 2$  diam.).
- Fig. 18. *Sacculina rotundata*, sp. n. ( $\times 2$  diam.).
- Fig. 19. Spicules from the epidermis of the same, as seen under a  $\frac{1}{4}$ -inch objective.

XLII.—*Description of a new Bat from Java, of the Genus Kerivoula.* By OLDFIELD THOMAS, F.Z.S., Assistant in the Zoological Department, British Museum.

THE specimen upon which this description is based was obtained by Mr. H. O. Forbes at Kosala, near Bantam, Java, 2100 feet above the sea, on the 24th of September, 1879, and is now in the British Museum.

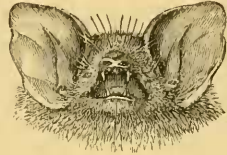
*Kerivoula javana*, sp. n.

Fur greyish black, each hair being nearly black for its proximal third, then white for the middle third, the end being black, with sometimes a shining white tip. Ears rather short; laid forward they reach to about halfway between the eyes and the tip of the nose. Shape of ears and tragus exactly as in *K. Jagori*\*, the former having the second small concavity in the middle of the outer edge, and the latter the deep horizontal

\* Peters, MB. Ak. Berl. 1866, p. 399; Dobson, Cat. Chir. B. M. p. 338.



notch above the external basal lobule described in that species, as shown in the woodcut. Distribution of fur as in *K. papuensis*\*, there being short shining yellowish hairs thickly set along the forearm, on the thumb quite to the claw, all along the second finger, on both phalanges of the third, and on the distal phalanges of the fourth and fifth fingers. There are also a few hairs on the proximal end of the fifth metacarpal. The tail and the hind limbs quite to the bases of the claws are covered with similar hairs; the edge of the interfemoral, however, is without a fringe. The teeth are quite similar to those of *K. papuensis*.



*K. javana* is thus intermediate between *K. Jagori*, a Philippine species, and *K. papuensis* from New Guinea, differing from the latter in the shape of the ears and tragus, and by the absence of an interfemoral fringe, and from the former by the presence of fur upon the limbs, that species having these quite naked†. It differs from both, however, in the tricolor character of the fur, as they are of a nearly uniformly dark reddish-brown colour, though the tips of the hairs are lighter.

Measurements of the type, an adult female in spirit:—Length, head and body 1<sup>''</sup>.93, tail 1<sup>''</sup>.72, head 0<sup>''</sup>.78, ear 0<sup>''</sup>.6, tragus 0<sup>''</sup>.37, forearm 1<sup>''</sup>.53, thumb 0<sup>''</sup>.27, third finger 3<sup>''</sup>.0, fifth finger 2<sup>''</sup>.2, tibia 0<sup>''</sup>.72, foot 0<sup>''</sup>.35.

XLIII.—Notes on the *Gasteropoda* contained in the Gilbertson Collection, British Museum, and figured in Phillips's 'Geology of Yorkshire.' By R. ETHERIDGE, Jun., F.R.Ph.S.Ed.

IN the 'Geological Magazine' for April 1879 (no. 178) I gave a few brief notes on the Bivalves contained in Gilbertson's collection of Carboniferous-Limestone fossils in the British Museum, and the majority of which were made the subject of illustration in the second volume of Phillips's work, 'Illustrations of the Geology of Yorkshire,' part 2, "The Mountain-Limestone District."

I now purpose following up this subject by an examination of the *Gasteropoda*, and in the present communication shall

\* Dobson, *tom. cit.* p. 339.

† Cf. Dobson, *tom. cit.* p. 332.